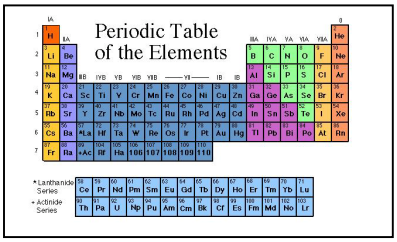
Activity # 11



Title: Graphing Trends in the Periodic Table-Student's Copy

Purpose: To graphically display various properties of selected elements on the periodic table as related to their atomic numbers to determine if periodicity exists

Materials: graphing calculator (Texas Instruments model TI-82 is used in this lesson.)

GRAPHING TRENDS IN THE PERIODIC TABLE

IA	IIA	IIIA	IVA	VA	VIA	VIIA	VIIIA
3	4	5	6	7	8	9	10
Li	Be	B	C	N	O	F	Ne
1.23	0.89	0.80	0.77	0.70	0.66	0.64	0.67
124	215	191	260	335	314	402	497
11	12	13	14	15	16	17	18
Na	Mg	Al	Si	P	S	Cl	Ar
1.57	1.36	1.25	1.17	1.10	1.04	0.99	0.98
119	176	138	188	242	239	299	363
19	20						
K	Ca						
2.03	1.74						
100	141						
37	38						
Rb	Sr						
2.16	1.91						
96	131						
55	56						
Cs	Ba						
2.35	1.98						
90	120						

LEGEND

8--------atomic number
O--------symbol
0.66-----atomic radius
314------energy to remove easiest electron

Procedure:

1. Make a **prediction** as to what will happen to the sizes of atoms as one progresses from left to right across a period on the periodic table. (Example: the sizes of atoms will (increase, decrease, remain constant) as one goes left to right across a period.
2. According to your prediction, make a **sketch** of how you would EXPECT a graph to appear if you plotted atomic number on the X-axis and atomic radius (size of the atom) on the Y-axis. (5 cm X 5 cm size is appropriate.)
3. Using the information supplied in the chart above, enter the atomic numbers of elements 3-20 in L1 and the corresponding atomic radius in L2 in your **graphing calculator**. Create a connected-dot line graph and display it on your calculator screen. Check for accuracy (with your beloved teacher!) before proceeding. If your graph is acceptable, **sketch** it on your answer sheet.
4. Record any **similarities and differences** between your predicted graph and the graph of actual data.
5. **What does happen** to the sizes of atoms as one goes left to right across a period?
6. Looking at the Bohr models of atoms in a period, offer an **explanation as to WHY** the atomic size changes as it does.

7-12. Repeat steps 1-6 above, except this time refer to **the change in the size of atoms going down a group**. Use elements #3, 11, 19, 37, & 55 for one graph and #4, 12, 20, 38, & 56 for another.

13-18. Repeat steps 1-6 above, except this time refer **the energy required to remove the easiest electron as one goes across a period.** Use elements #3-20.

19-24. Repeat steps 1-6 above, except this time refer to **the energy required to remove the easiest electron as one goes down a group**. Use elements #3, 11, 19, 37, & 55 for one graph and #4, 12, 20, 38, & 56 for another.

25. How many ACTUAL graphs created in this activity demonstrated some form of repeating pattern? Those that do would be demonstrating "periodicity" or properties that reoccur periodically---over and over again.

26. What PROPERTIES of elements visibly show periodic trends when their values are graphed?